



NAC Subcommittee on
Education and Outreach
July 19, 2010

NASA Elementary and Secondary Program Overview: *Components, Processes, and Projects*

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Outcome Manager

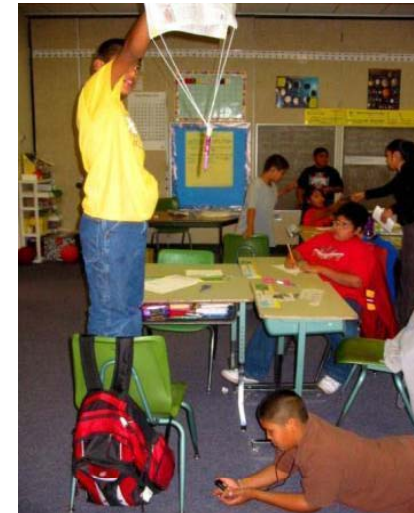
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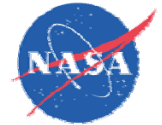
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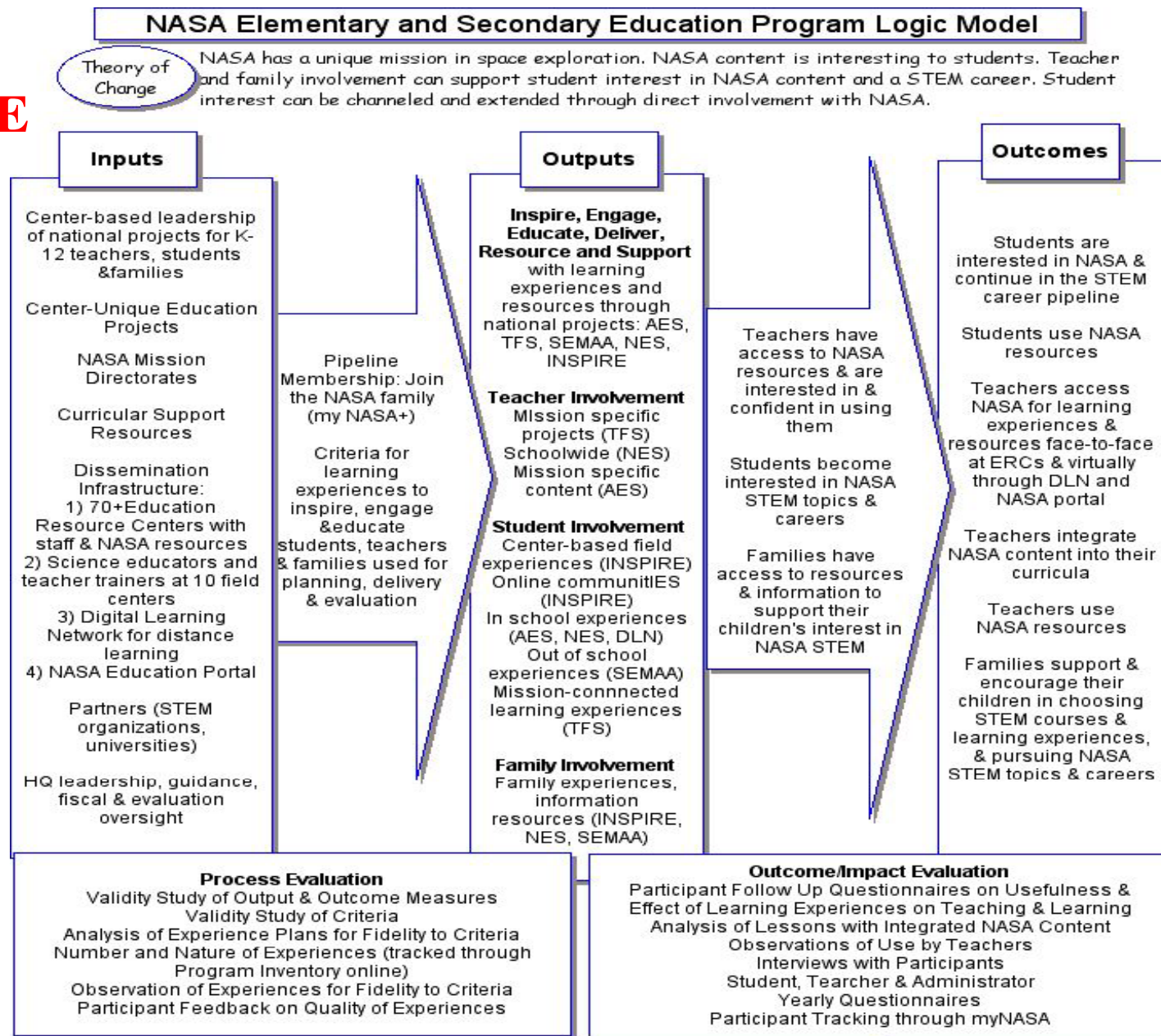
Presentation Overview

- **K-12 Program Components and Processes**
 - Program Logic Model and Project Life Cycle
 - Research base approach, formative-summative evaluations and technology strategy
- **Life Cycle: Project Implementation**
 - NASA Explorer Schools Model Redesign
- **Life Cycle: Project Formulation**
 - Summer of Innovation Pilot
- **Program Enrichment**
 - Strategic Partnerships, Competitive Solicitations, and Interactive Resources
- **Backup Slides**

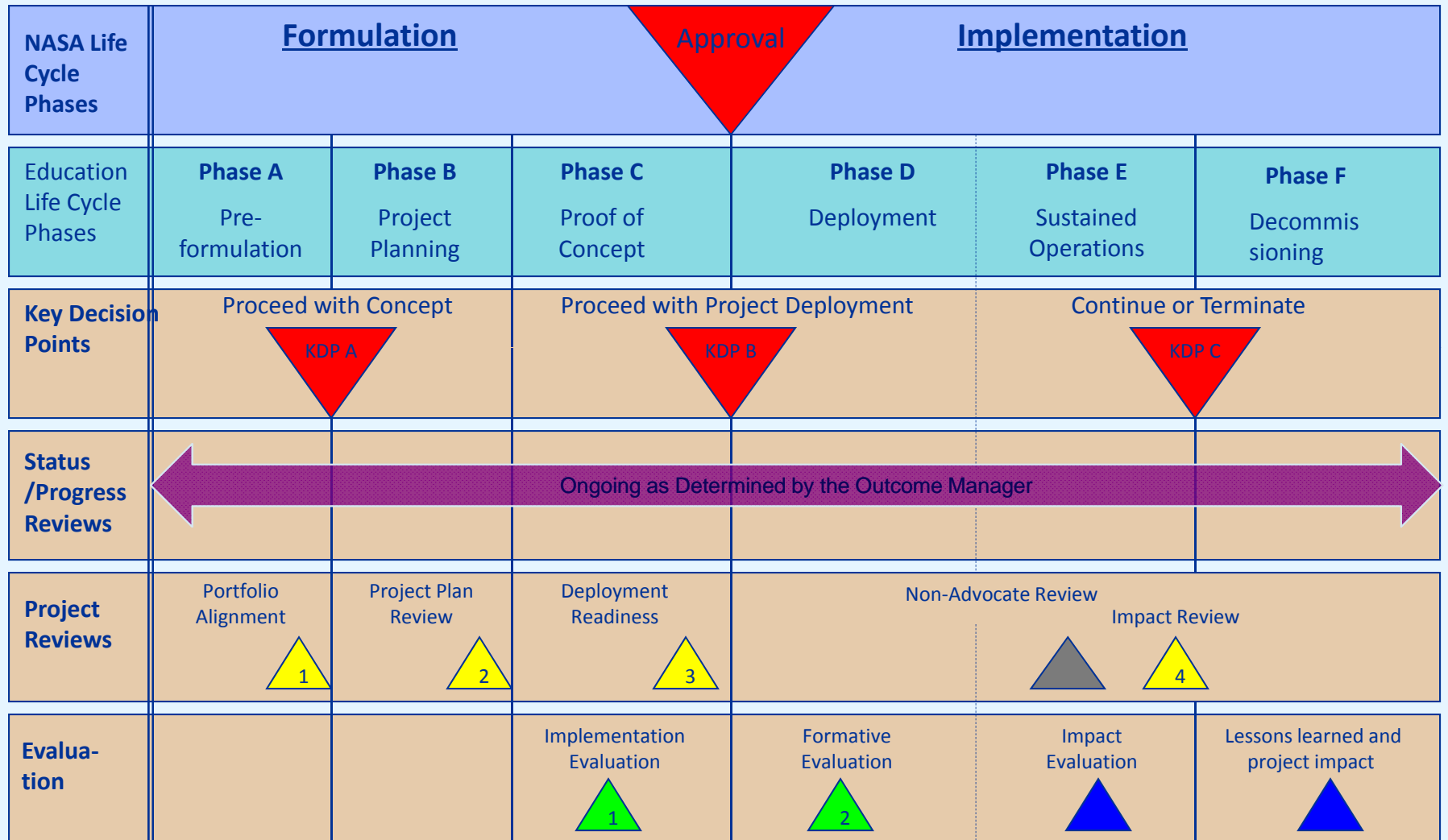


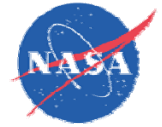


SAMPLE



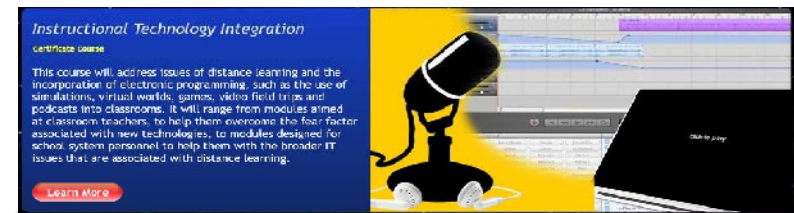
Education Project Life Cycle

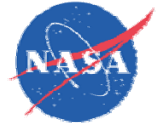




Program Overview

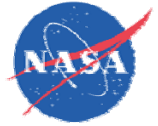
- **NASA's K12 STEM Program.** Provide students and educators with tools, experiences, and opportunities to further their education and participation in unique NASA learning experiences that enhance their knowledge of STEM. The program integrates new components with existing NASA assets into a structure that supports local/state education efforts to encourage student involvement in STEM.
 - The **STEM Student Opportunities** suite of projects focuses on engaging and retaining students in STEM education programs to encourage pursuit of NASA's future engineering, scientific, and technical missions through flight opportunities, hands on research and engineering experiences, and increased knowledge of NASA science and technology content.
 - **NASA Explorer Schools (NES)**
 - Science Engineering Mathematics and Aerospace Academy (SEMMA)
 - Education Flight Projects (EFP)
 - Interdisciplinary National Science Program Incorporating Research and Education Experience (INSPIRE)
 - Learning Technologies Project (LP)
 - **Innovation in K-12 STEM Education**
 - Cooperative Agreement Notice
 - **Summer of Innovation**
 - **STEM Teacher Development** projects use NASA's unique content and resources to provide pre-service and classroom teachers with learning experiences that build critical instructional STEM skills and enable teachers to better motivate students to achieve academic excellence and pursue STEM careers.
 - NASA Educational Technology Services (NETS)
 - Aerospace Education Services (AESP)
 - Learning Environments And Research Network (LEARN)
 - Endeavor Science Teacher Certificate Project (ESTCP)
 - eEducation Small Projects



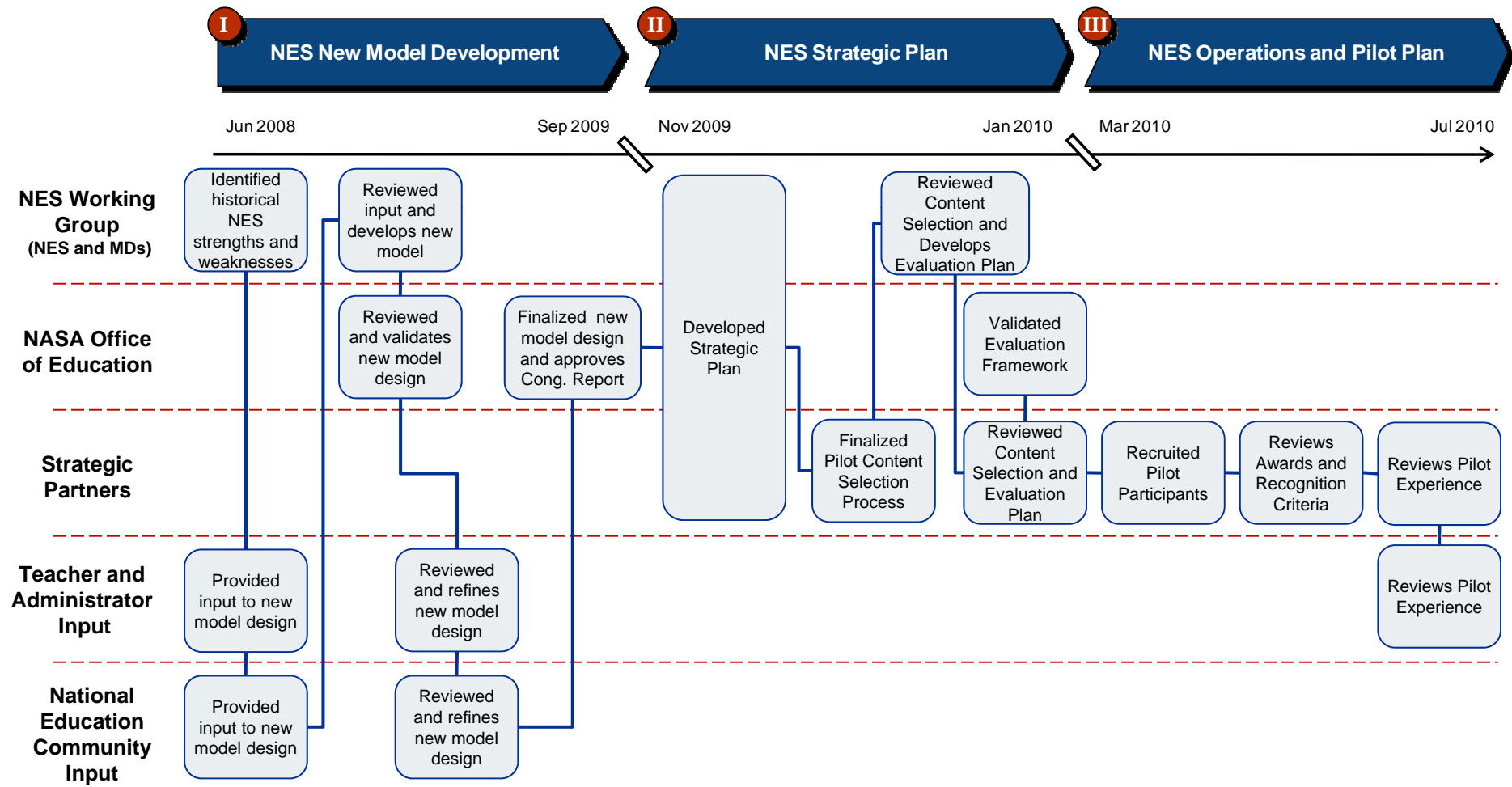


NASA Explorer Schools Formulation and Pilot Briefing

Rob LaSalvia
Project Manager
NASA Explorer Schools



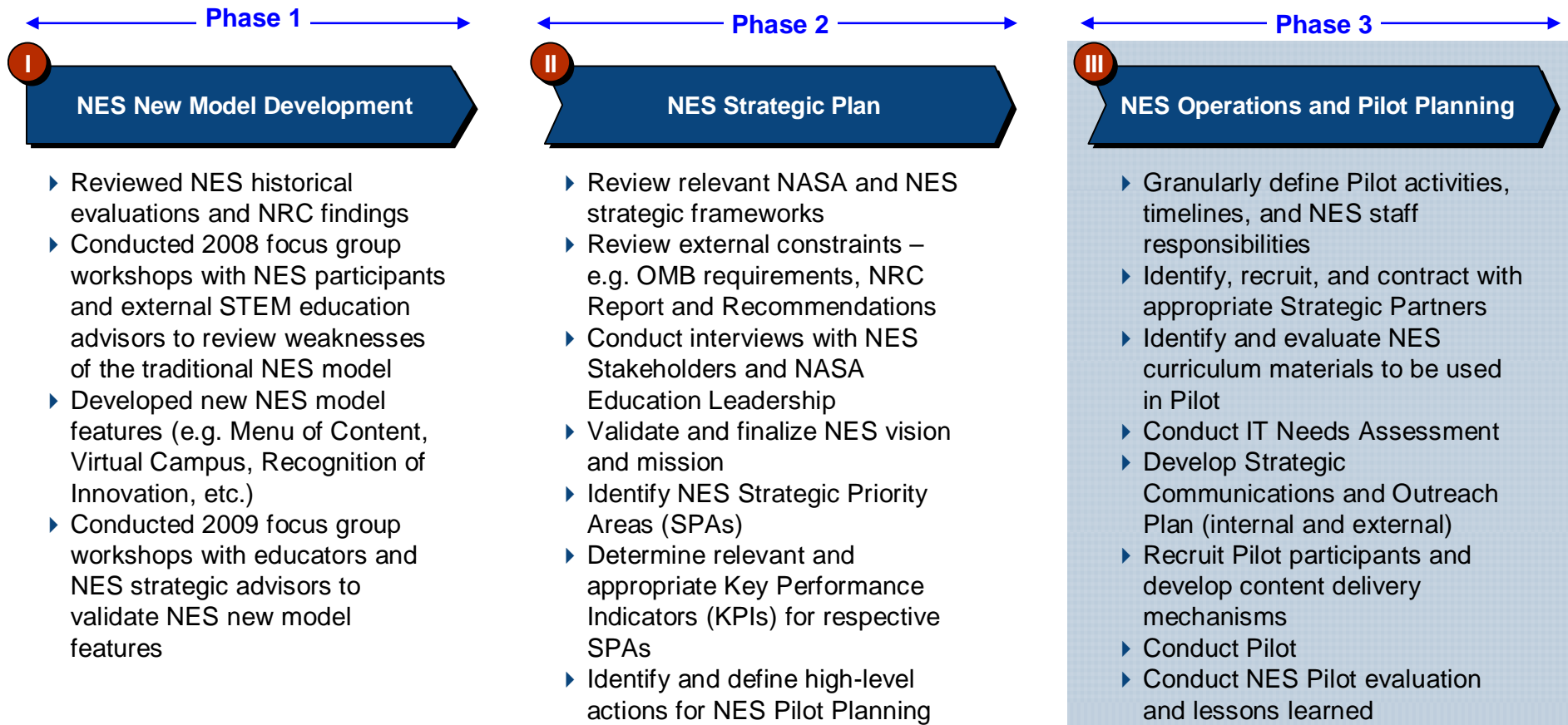
The NES Project worked closely with internal and external partners throughout its three-phased development, planning, and implementation process





The recently completed final phase in the development process was to launch a Pilot of the new NES model

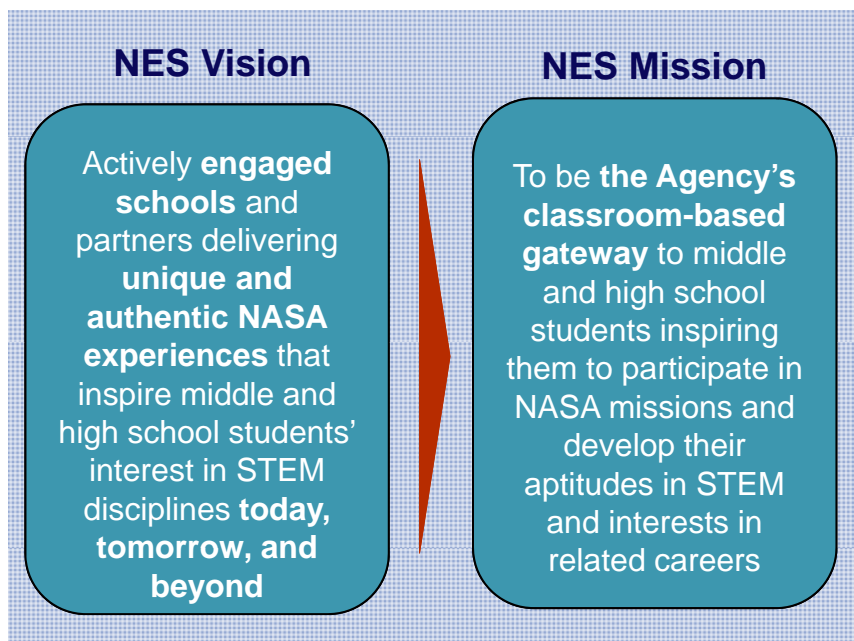
NASA Explorer Schools Development Process



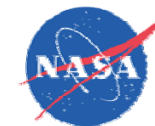
■ Current Developmental Phase



NES's Vision and Mission highlight the four dominant themes or desired attributes of the NES Project...



- 1 Open Access**
NES is designed for broad participation and requires no application process; project materials are accessible for all types of schools (public, charter, private, urban, rural) at the middle and high school levels
- 2 Flexibility**
The NES Project offers multiple pathways for participation; the project allows for whole school or individual teacher engagement and will provide recognition and grant opportunities based on outputs and participation levels
- 3 Student Engagement**
NES offers teachers access to a selection of the best NASA educational content and focused support materials to engage students in activities designed around NASA's mission and current research
- 4 NASA Gateway**
The NES Project is designed to be NASA's primary access point into the classroom; the project aligns with other K-12 and higher education activities to promote continued engagement with NASA



...and these attributes of open access, flexibility, student engagement and NASA gateway are easily found in the structure of NES's four core elements

| | Description | Pilot Findings |
|--|--|---|
| Curriculum Support Modules | <ul style="list-style-type: none"> Classroom based activities and lessons built around NASA's mission. Modules were Pre-selected by external review process to ensure classroom relevance, student engagement, rigor, and usability | <ul style="list-style-type: none"> Materials align with research based best practice for effective student knowledge gains and have been reviewed and validated by national strategic partners 90% of teachers either agreed or strongly agreed that modules were a good fit in the classroom and a good use of instructional time By a 3:1 margin students agreed that the NES experience inspired them to learn more about STEM. |
| Electronic Professional Development | <ul style="list-style-type: none"> Live and self-guided opportunities delivered through on-demand video and collaborative technology. Designed to support teachers in implementation of classroom modules | <ul style="list-style-type: none"> 88% of pilot participants agree or strongly agree that electronic professional development opportunities made them feel confident in presenting NES modules 85% of pilot participants agree or strongly agree that electronic professional development makes them more effective in teaching STEM concepts contained in NES modules |
| Digital Connections with SMES | <ul style="list-style-type: none"> Student briefing from scientists, engineers and research delivered through streaming video, chat and collaborative tools. Intended to provide window into public window into NASA research and exploration | <ul style="list-style-type: none"> 87% of teachers agreed or strongly agreed that the virtual experience could directly be related to the STEM topics that they teach in the classroom 88% of teachers agreed that the virtual experiences encouraged student exploration, discussion and participation |
| <i>Planned for Y1</i> Teacher, Student, and School Recognition | <ul style="list-style-type: none"> Participant recognition opportunities intended to incentivize long duration participation, encourage use of research based best practice and highlight teacher and student innovation | <ul style="list-style-type: none"> NES recognition structure has been validated by strategic partners and pilot participant teachers |



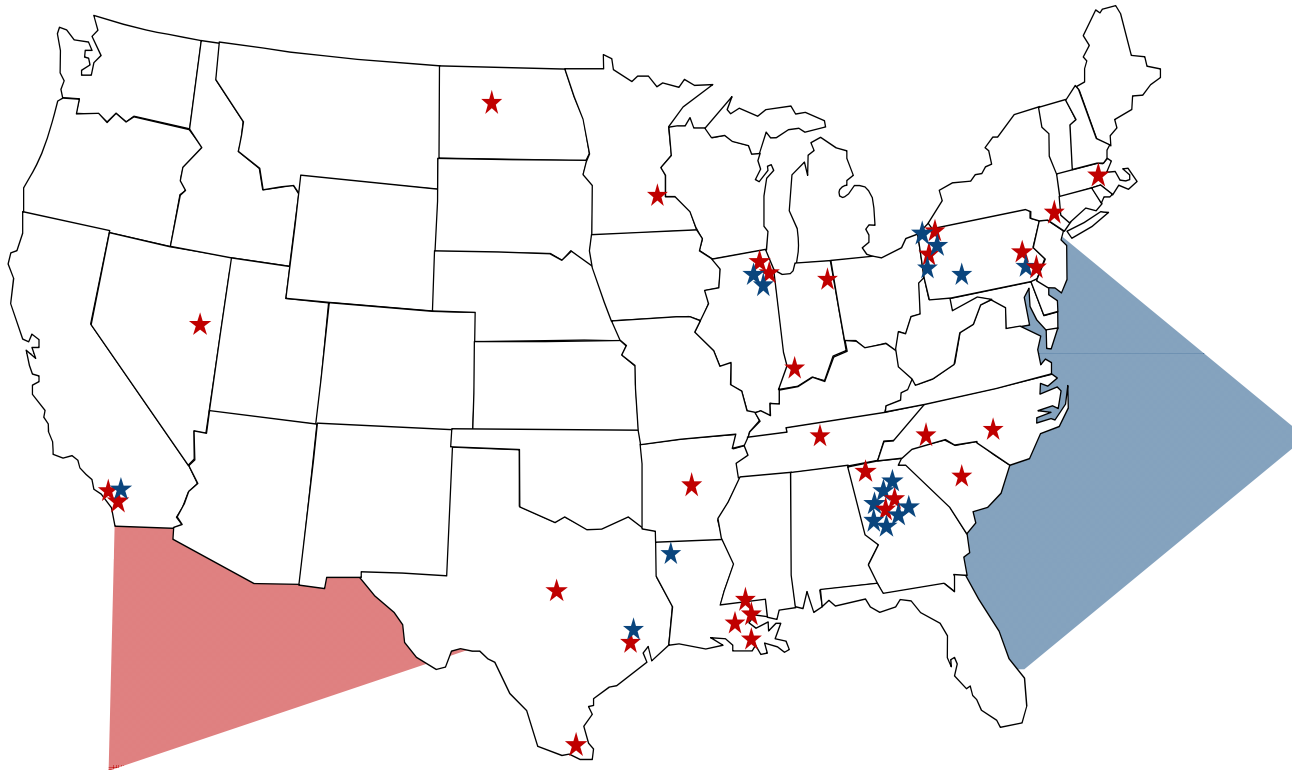
NES leveraged the skills and expertise of strategic partners to help refine and improve pilot project features and functionality

2009 – 2010 NES Project Strategic Partners and Areas of Engagement





The NES Pilot Project had 57 teachers from 48 elementary, middle, and high schools from across the country

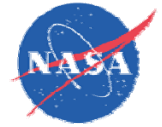


NES High Schools

- ★ Village Academy High School (CA)
- ★ Newnan High School (GA)
- ★ Alexander High School (GA)
- ★ Temple High School (GA)
- ★ Open Campus High School (GA)
- ★ East Jackson Comprehensive High School (GA)
- ★ Salem High School (GA)
- ★ Rockdale Career Academy (GA)
- ★ Kennedy High School (IL)
- ★ Bogan High School (IL)
- ★ Captain Shreve (LA)
- ★ Minot Public School (ND)
- ★ Riverhead High School (NY)
- ★ Bishop Shanahan High School (PA)
- ★ Richland Senior High School (PA)
- ★ Harbor Creek High School (PA)
- ★ Union City Area High School (PA)
- ★ Jamestown Area High School (PA)
- ★ Central High School (PA)
- ★ Sam Rayburn High School (TX)

NES Elementary and Middle Schools

- | | | | | |
|--------------------------------|------------------------------------|--|--------------------------------------|--|
| ★ Carver Magnet School (AR) | ★ Talcott School (IL) | ★ Sherwood Middle School (LA) | ★ East Hoke Middle School (NC) | ★ Forest Lake Elementary |
| ★ Lakeview Elementary (CA) | ★ Lara Academy (IL) | ★ Bird Middle School (MA) | ★ Jamestown Area Junior High (PA) | ★ Technology Magnet School (SC) |
| ★ Stevenson Middle School (CA) | ★ St. Peter and Paul School (IN) | ★ Farnsworth Aerospace School (MN) | ★ Harbor Creek Junior High (PA) | ★ Stovall, Carter and Carroll Academies (TX) |
| ★ Roan School (GA) | ★ Franke Park Elementary (IN) | ★ White Pine Middle School (NV) | ★ Trexler Middle School (PA) | ★ Westward Elementary (TX) |
| ★ Conyers Middle School (GA) | ★ Lacache Middle School (LA) | ★ Lakeland Copper Beach Middle School (NY) | ★ St. Katharine of Siena School (PA) | ★ Hobgood Elementary (TN) |
| ★ Memorial Middle School (GA) | ★ Tchefuncte Middle School (LA) | ★ Vance Elementary School (NC) | | |
| | ★ Lucille Nesom Middle School (LA) | | | |



Pilot Schools represented a broad and diverse range of participants

NES Pilot – Participant Snapshot

| NES Elementary & Middle Schools ¹ | NES High Schools ¹ | Total Participant Snapshot |
|--|--|---|
| <ul style="list-style-type: none"> ▶ No. of Schools: 28 ▶ Geographic Distribution: <ul style="list-style-type: none"> ○ 7 Rural ○ 9 Suburban ○ 12 Urban ▶ Under-served Schools²: 18 ▶ Student Population Demographics <ul style="list-style-type: none"> ○ 7 Majority Hispanic ○ 6 Majority African-American ○ 1 Majority Asian | <ul style="list-style-type: none"> ▶ No. of Schools: 20 ▶ Geographic Distribution <ul style="list-style-type: none"> ○ 8 Rural ○ 7 Suburban ○ 5 Urban ▶ Under-served Schools²: 7 ▶ Student Population Demographics: <ul style="list-style-type: none"> ○ 3 Majority Hispanic ○ 2 Majority African-American | <ul style="list-style-type: none"> ❖ Total No. of Schools: 48 ❖ Total No. of Teachers³: 57 ❖ Total No. of Students⁴: 3062 ❖ Total No. of States: 16 |

Notes: 1. Data extrapolated from National Center for Education Statistics (nces.ed.gov)
 2. Under-served schools defined as schools where more than 50% of the student population receive free-lunch
 3. Total No. of teachers identified through teacher interviews
 4. Total No. of students identified Student Pre-test Surveys



The NES website design is based around usability and prominently presents the key features of the Pilot

NES Pilot Website – Homepage Key Features

Navigation Bar

The Navigation Bar links NES participants to key areas of the Virtual Campus, including the About page, Curriculum Modules, FAQs, and the Events schedule

Schedule of Events

Upcoming NES events, including Live Electronic Professional Development and Virtual Breaking News sessions, are centrally located on the NES website

Teacher Blog

NES maintains a blog to communicate with teachers, announce upcoming events, and answer incoming participant questions

Virtual Breaking News

The NES Pilot's Virtual Breaking News (VBN) events are prominently displayed on the front of the NES Virtual Campus and rotate weekly according to event schedule

The screenshot shows the NASA Explorer Schools Pilot Project homepage. The browser window title is "NASA - NASA Explorer Schools Pilot Project - Mozilla Firefox". The address bar shows the URL "http://www.nasa.gov/offices/education/programs/national/nas/home/index.html". The page features a "Virtual Campus" header with a NASA Explorer Schools Pilot Project logo. Below the header, there is a "Navigation Bar" with links: Home, About NES, Teaching Materials & Support, Frequently Asked Questions, Event Schedules, and Contact NES. The "Events Schedule" section is prominently displayed, featuring a table of upcoming events. The "Teacher Blog" section is also visible, with a link to "Find teacher tips on using materials in your NES pilot project". The "Virtual Breaking News" section is highlighted, showing a "This Week's Topic: Hubble's 20th Anniversary" with a colorful nebula image. The Twitter updates section on the right shows recent tweets from @NASA.

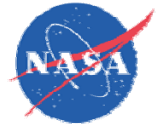
| Training Session Title | Date | Time | Duration |
|------------------------|----------|---------------|------------|
| Orientation | March 31 | 5:00 p.m. EDT | 30 minutes |
| Orientation | March 31 | 7:00 p.m. EDT | 30 minutes |



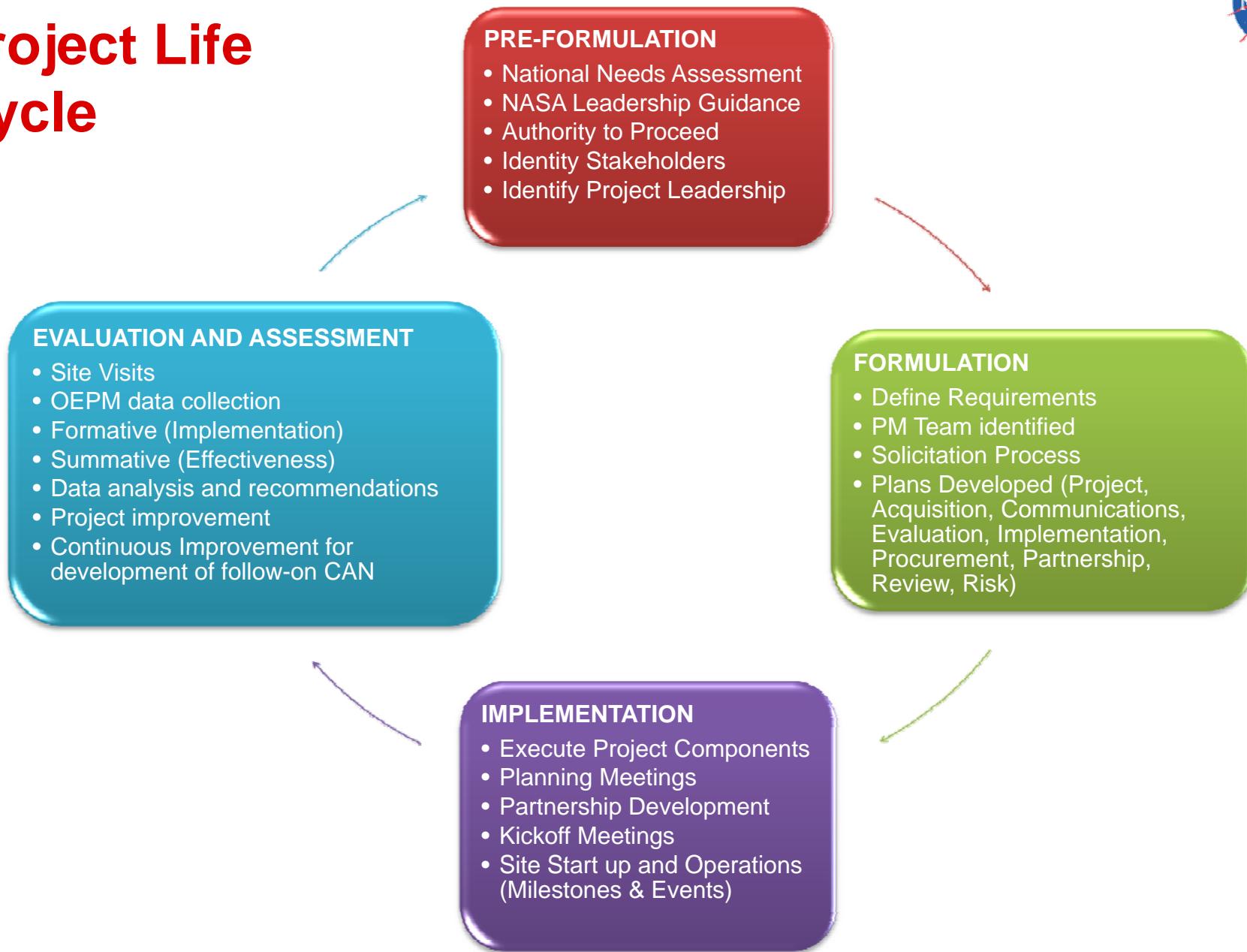
NASA Summer of Innovation Formulation and Pilot Briefing

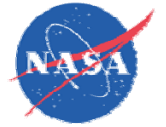


Dovie Lacy
Project Manager
Summer of Innovation



Project Life Cycle





Multi-faceted Approach





Component Descriptions

Space Grant: Through the NASA Summer of Innovation Pilot Solicitation, four Space Grant proposals from Summer of Innovation CAN have been awarded. The Cooperative Agreement will enable NASA to utilize the existing Space Grant state-based network to provide direct professional development for 673 STEM educators, and direct summer STEM learning experiences for 6,195 middle school students, with specific attention on underrepresented and underserved students, and students underperforming in STEM disciplines. These students shall be tracked over the next two academic years. An additional 1,403 STEM educators and 56,840 students will be engaged in summer STEM enrichment activities and through interactions with Sol trained educators.

Contract Award: NASA will add a Summer of Innovation task to an existing STEM education contract. The selected contractor shall be able to serve 5,000+ middle school students and track their interest and academic performance; must offer a summer learning experience 1-4 weeks in duration; and are able to add NASA content into a 2010 summer program. The period of performance for this work is 30 months; from June 1, 2010 through October 31, 2012. The estimated funding for this task is \$2 million.

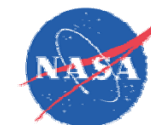
Center Collaborations: NASA Centers will work to select targeted cities or entities that serve the populations that meet the objectives of the Summer of Innovation. This will utilize the strength of NASA's workforce to contribute the Summer of Innovation. Centers will utilize specialized NASA Summer of Innovation content and resources to incorporate NASA content into targeted locations to conduct hands-on. Additionally, national projects which include year-round experiences and can track student STEM interest shall be directed to implement content and resources over the summer.



Component Descriptions (cont.)

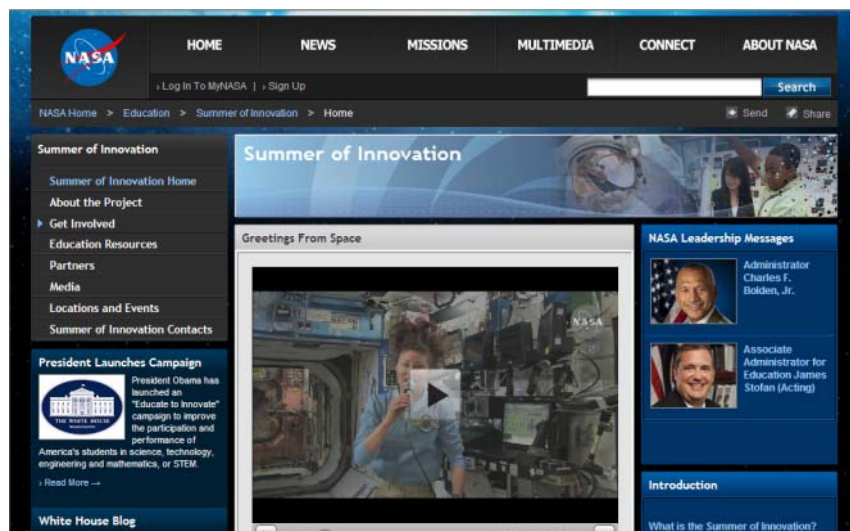
Partnership Development: NASA is looking for partners to develop creative ways to help with achieving Sol goals and to increase the impact and visibility of Sol. NASA will enter into as many qualified collaborations as possible, without limiting the types or categories of activities, events, products, or services, that reflect NASA's mission, values and goals. Respondents will be responsible for financing their own activities. Participation in Sol will be contingent upon selection by NASA and negotiation of an appropriate Agreement between NASA and the respondent that will define the roles and responsibilities of the parties.

National Call: A national call for participation inviting all STEM Stakeholders interested in incorporating NASA content into summer learning experiences to become part of the NASA Summer of Innovation (Sol). Those entities (families, educators and organizations) interested in participating will be asked to register on the Sol website and be provided the options to register an event and submit event data (total participant numbers for students, teachers, and families) and to access special features on the Sol website including a NASA Sol Certificate of Participation and the ability to share a photo and Summer of Innovation story. Driving collaboration and partnership development is key to the success of the Summer of Innovation Pilot. The Open Call will be one of the entry points for STEM Stakeholders to participate in the NASA Sol providing them the opportunity to become STEM Collaborators.



Communications

Phase 1 Website Live 6/8/2010



www.nasa.gov/soi

Phase 2 Website - Late July

- Increased Functionality
- Challenges
- Registration
- “Tell Us Your Story” & Upload Photos
 - SOI Participants
 - NASA Employees/Staff

NASA HQ Banners



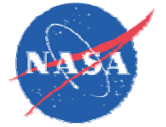
Messaging/Awareness Activities

- Messaging Toolkit
- PSAs
- FAQ/RTQ
- National Education Campaign
- Competitions and Challenges

Flyer

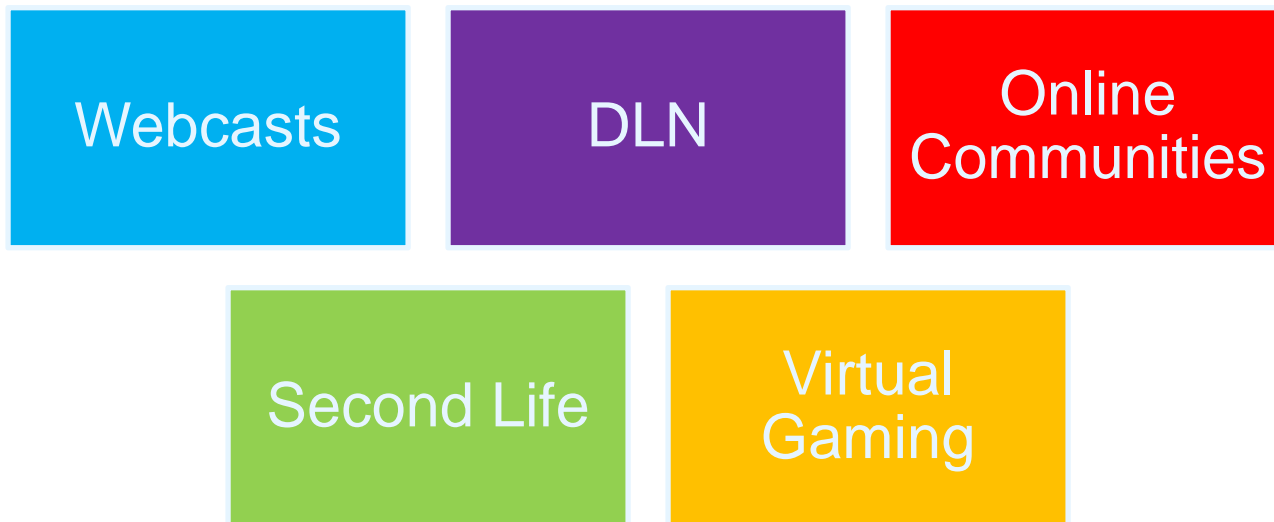
Print Products

- Poster (teachers & students)
- Bookmark/Ruler (collect all 4)
- Major NASA HQ Exhibit
- Vinyl Signs



Elementary and Secondary Program Enrichment

- Strategic Partnerships and Competitive Solicitations
- Interactive resources to expand reach, capture interest and connect audience groups





2009 Performance and Recent Highlights/Results



1,176,574 K-12 students engaged

81% students expressed interest in science, technology, engineering, and math (STEM) careers following involvement in NASA program

80% of educators in NASA training use resources in the classroom

54,046,681 total number of page views, almost 1 million page views more than in FY08.

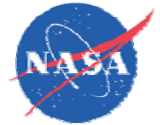


BACK UP SLIDES



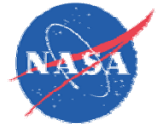
Project Descriptions—Elementary and Secondary

- NES - NASA Explorer Schools: NES is a "pipeline" strategic initiative that promotes and supports the incorporation of NASA content and Projects into STEM curricula. Designed for middle and high schools, NES bring together educators, administrators, students and families in sustained involvement with NASA's education projects. Project elements include school grants to support the purchase of technology tools, educator professional development, online services, student opportunities for active participation in NASA related research, problem solving and design challenges, and family involvement in learning. www.nasa.gov/education/nespilot
- SEMAA - Science Engineering Mathematics and Aerospace Academy: SEMAA is a K-12 curriculum supplement project designed to increase the participation and retention of historically underserved and underrepresented K-12 youth in STEM. SEMAA delivers three core components: a set of hands-on, minds-on K-12 STEM curriculum enhancement activities, a state-of-the-art Aerospace Education Laboratory (AEL), and an innovative Family Café. SEMAA inspires a more diverse student population to pursue careers in STEM-related fields, engages students, and parents/adult family members, and teachers by incorporating emerging technologies, and educates students by using rigorous STEM curriculum enhancement activities. www.nasa.gov/education/semaa
- EFP - Education Flight Projects: EFP manages a portfolio of Center supported activities involving K-12 educators and students in hands-on experiences and research applications on-board a variety of NASA flight platforms and in NASA ground-based facilities. Educators and students sign up to participate in the EFP portfolio of activities that are scheduled throughout the year. EFP facilitates and funds unique opportunities for educators and students that feature NASA missions, content, facilities, and people. www.nasa.gov/education/tfs



Project Descriptions—Elementary and Secondary

- **INSPIRE - Interdisciplinary National Science Program Incorporating Research and Education Experience:** INSPIRE is a STEM career exploration project for high school students in grades 9th through freshman year of college centered around INSPIRE's extensive online community (OLC) where they and their parents have access to activities and resources and interact with peers, NASA experts and education specialists. INSPIRE's OLC students are also eligible to compete for enriching summer hands-on experiences including a center workshop and tour, a two-week collegiate experience, and internships designed to maximize student involvement in STEM education. www.nasa.gov/education/inspire
- **LTP - Learning Technologies Project:** LTP is a NASA-wide education technology development initiative. LTP supports the development of projects that deliver NASA content through revolutionary technologies to enhance STEM education. Research and development are at the core of the LTP mission and the project is NASA's educational technology incubator. LTP seeks to enhance formal and informal education in STEM fields with the goal of increasing the number of students in those fields of study. LTP combines the talents of educators, industry, academia, non-profit organizations and NASA's Mission Directorates to develop educational technologies that enable, empower, and educate learners of diverse backgrounds, characteristics, and abilities. <http://www.nasa.gov/offices/education/programs/national/ltp/home/index.html>
- **NETS - NASA Education Technologies Services:** NETS is a cross-cutting NASA education technology project that prepares and delivers educational Web content for K-12 and higher education educators and students. NETS generates and maintains NASA Portal content about NASA education projects and audience-appropriate information about NASA research, missions and careers. It also supports the online presence for other agency education offerings. NETS staff comprises former classroom teachers, writers and a technical Web support team. www.nasa.gov/education



Project Descriptions—Elementary and Secondary

- **AESP - Aerospace Education Services Project:** AESP is a multifaceted national education project that provides a wide variety of NASA education services for educators and students in higher education, K-12 STEM education, and informal education. Administered under a cooperative agreement with Penn State University, AESP places education specialists at each of the NASA centers for the purpose of providing in-service training for teachers, classroom demonstrations, distance learning events, and pre-service training for university students. NEON is the electronic technology component of AES with purpose to connect STEM educators with scientists and engineers and with each other <http://neon.psu.edu>
- **LEARN - Learning Environment and Research Network:** LEARN is a suite of three E-education activities that provide distance learning opportunities to students and educators, and conduct research and development initiatives in educational technology. The activities are the NASA Digital Learning Network™, The NASA-sponsored Classroom of the Future, and the NASA Electronic Professional Development Network. <http://dln.nasa.gov> <http://www.cotf.edu> <http://www.nasaepdn.gatech.edu>
- **ESTCP - Endeavour Science Teachers Certificate Project:** ESTCP is a fellowship project for in-service and alternative-route teachers. The project will award over 200 fellowships over five years. The project provides workshops for science teacher educators in colleges of education to assist them in delivering NASA content in methods and practicum courses for pre-service teachers. A majority of the Endeavor fellows will serve underrepresented student populations. ESTCP Fellows will be selected by a diverse group of science education professionals and represent 50 states, Puerto Rico and U.S. Territories. <http://www.us-satellite.net/endeavor/index.cfm>



Project Descriptions—Elementary and Secondary

- eEducation Small Projects/Central Operation of Resources for Educators (CORE): eEducation Small Projects is an umbrella term for an infrastructure for distributing NASA research-based technology applications, products, and materials to enhance the educational instruction of K-12 and informal educators. The primary small project is the NASA-sponsored Central Operation of Resources for Educators (CORE) which, in coordination with the Educator Resource Center Network (ERCN), provides educators access to NASA-developed educational products and materials. Operated through a cooperative agreement with Lorain County Joint Vocational School in Oberlin, Ohio, CORE serves as a world-wide distribution center for NASA-produced multimedia materials and coordinates communication related to product availability with the ERCN. www.nasa.gov/education/core
- Congressionally-initiated Competitive Grants and Cooperative Agreements. K-12 Cooperative agreements support projects that incorporate innovative approaches for development and delivery of instructional materials and experiences that capture the interest of learners and actively involve them in relevant, NASA STEM-themed content applications. In FY 2010 proposals must be submitted via a U.S. school district, state-based education leaders, and not-for-profit education organizations that support secondary education. The FY 2010 call for proposals will close on July 19, 2010. Awards have a two-year period of performance and may have a value up to \$480,000 in FY10 solicitation.
<http://nspires.nasaprs.com>
 - New Administrator Initiative – Summer of Innovation begun January 2010 with OMB approval to proceed from \$10M pilot in FY10 to full implementation in FY11. FY10: \$10M pilot from K12CG (\$15M total) www.nasa.gov/soi